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# How to Make Portraits

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THIRTIETH THOUSAND  
Revised and Enlarged

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# How to Make Portraits

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**W**HEN the amateur first essays to portray his friends, the results are usually far from pleasing. This is due to a variety of causes, the recognition and avoidance of which it is the purpose of this booklet to explain. It is only by approaching the problem of home portraiture with an intelligent idea of the difficulties which exist and the ways in which they may be surmounted that acceptable likenesses can be made.

**Previous Experience.**— Most camera owners quickly acquire a good knowledge of outdoor work in its different branches and have little difficulty in securing creditable prints of subjects which interest them, when once the exposure problem has been mastered.\* When, however, they apply their experience to the field of portraiture, they soon find that methods of handling the negative must be very different if the results are not to be unspeakably harsh and distressing to those who know the sitter. It is necessary, therefore, to review carefully their knowledge of exposure and development in order to be able to produce softer, thinner, and altogether more harmonious negatives than they habitually make of landscape subjects. Some thought must also be given to the use of soft-working papers, and, in addition, an entirely new mass of facts about posing, lighting, ex-

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\*See *Practical Photography No. 1*, "The Secret of Exposure."

posing, etc., must be more or less laboriously acquired. It is to shorten and render less difficult the operation of storing up these facts that this booklet is written; but we must presume that the reader has already acquired a good general knowledge of photographic processes.

**What is a Portrait?**— Before beginning the serious consideration of any subject, it is important to know just what we mean by the words used in connection with it. A portrait, in the common meaning of the term, is a picture of a person which is a likeness, and at the same time expresses the way in which the maker saw the sitter. For our purposes, the attribute of likeness is more important than anything else, for what we desire is to show the aspiring amateur how to make good likenesses of his sitters. The subject is a complicated one, but we shall endeavor to simplify it by giving specific directions which shall almost automatically ensure that the picture shall resemble the sitter.

**Portraits in the Home.**— Likeness is so much more easily secured among home surroundings that even professional photographers are making a specialty of going to the houses of their patrons and photographing them in natural poses, with the ordinary furniture of the room as accessories. Their knowledge of lighting, exposure, development, and printing is what makes it easy for them to secure good results; by a little study the amateur can master these points and is then in a position of advantage — knowing his sitters intimately, he should be able to do even better work than the professional.

**The Common Causes of Failure.**— Since any camera which can be arranged for time exposure will take a portrait, the chief limitation imposed by the ordinary

types of amateur apparatus is that of size of the image. Enlarging is the easiest way to make a small image bigger — a far better way than to use the lens close to the subject, whether with or without the supplementary lens called a “portrait attachment.” No matter what camera you have, then, you can make a portrait with it if you take care not to have it so close to the sitter that the image cannot be focused. The second chief cause of failure is harsh lighting. Next comes underexposure generally accompanied by overdevelopment in too strong a solution; and, finally, unsuitable finishing of the picture. Let us discuss these topics more in detail.

**Perspective and the Lens.**—Professional photographers employ lenses of longer focus than those ordinarily used by amateurs. For example, it is not unusual for a cabinet ( $3\frac{7}{8} \times 5\frac{1}{2}$ ) portrait to be made with a 13-inch lens; but the amateur with a postcard camera ( $3\frac{1}{4} \times 5\frac{1}{2}$ ) is generally restricted to one having a focal length of  $6\frac{1}{2}$  inches. Now, with the same point of view, or distance from lens to sitter, the 13-inch lens will make an image exactly twice as large as the  $6\frac{1}{2}$ -inch lens. If this distance is  $8\frac{1}{2}$  feet when photographing only head and shoulders, the length of the head from top to chin will be in the first case 1 inch and in the second  $\frac{1}{2}$  inch. By enlarging the smaller image two diameters (to 1 inch long), the smaller lens will give the same results as the bigger and more expensive one. The important thing to remember is that 8 feet is about as near as the lens should be brought to the face of the sitter for a portrait, because it is the nearest distance which will give natural perspective. The subject of perspective in general is too big to go into here; but this one fact, as just stated, should be at once com-

mitted to memory and then if you depart from the rule you will know that the lack of likeness is due to distortion from bad perspective drawing of the features. From an artistic point of view, this rule bars the "portrait attachment," which has generally to be used with the lens  $3\frac{1}{2}$  feet from the face of the sitter. If you doubt the distortion, take two pictures of the same subject, one from 8 feet (most kodaks have this mark on the focusing scale) with the regular lens, the other from  $3\frac{1}{2}$  feet with the portrait attachment, and compare the prints from the negatives. In the same manner, 17 feet is the ideal shortest distance between lens and sitter for a full-length figure. Of course, one cannot get as far away as that in most houses, but the nearer one can come to it the better the perspective is sure to be. The lesson of this paragraph, then, is to disregard the size of the image on the ground glass and rely on enlarging if a head larger than the lens will give at 8 feet is desired.

**Harsh Lighting.**— Ask a friend to sit near a large window as close to it as he can get and from a position near the wall observe the light on the face. Then have him move into the room a foot at a time, watching how the light spreads and diffuses over the face as he increases the distance from the source of light. This simple experiment will teach you at once the reason why most amateurs' pictures of their friends are of the "soot and whitewash" order. The sitter has been placed too close to the light. All the illumination has been concentrated on the lighted cheek, and the contrast between it and the shaded one is so great that no ordinary exposure could record any detail. In addition to harshness, there is usually the wrong direction of the light, which, for portraiture, should come mostly from above

the head, instead of from the same level. Furthermore, it will be seen that a reflector is often essential to lighten the shadow side of the face and by thus bringing it nearer in tone to the lighted side to allow a reasonably short exposure.

**Exposure.**— It may be laid down as a rule that it is seldom possible in home portraiture to overexpose, though if a flat lighting is chosen, the contrasts of light and shade are almost destroyed and a flat result will follow too generous an exposure. However, exposures required indoors are usually several hundred times those which would be necessary outside on the same day. Light colored subjects, such as children in a white-painted room full of windows, may perhaps be secured with a slow snapshot and an  $f: 4.5$  lens; but rooms in which the required exposure mounts into seconds are far more common. Experience, guided by an actinometer exposure-meter, such as the Watkins or the Wynne, must be relied on to teach you the time to give in the circumstances which surround your own work. The method of using the meter, however, is so important that we had better explain it in detail.

Assuming that a Watkins Bee meter is being used, first pose and arrange your subject and as soon as the exact position he is to occupy is found, test the light. Holding the meter close to the head of the subject and facing the window, expose a section of the sensitive paper and note the time by the watch. As soon as a faint gray tint is visible, note the number of seconds which has expired. This first visible darkening of the meter paper is the sixteenth tint. Multiply the number of seconds by sixteen, to obtain the full actinometer time for calculating the exposure. This method saves

time and gives a more certain means than any other of determining the exposure in strange surroundings. Exposure-tables can, however, be used with success, particularly if one makes a series of trial exposures in order to select the right factors for local conditions. For instance, the American Photography Exposure Tables give the factor for "indoor portraits" as 8 to 10. The smaller of these might be sufficient in a light-colored room near a large window with the sitter dressed in light colors and plenty of reflected light on the shadow side, either from objects in the room or a white reflector; the larger might not be great enough in a small, dark room with red paper, and a value of 12 or 14 might have to be adopted.

**Improper Lighting and Exposure.**— If the shadow side is too dark — so shrouded in gloom that the local color of the skin cannot be seen throughout — it will be found almost impossible to give enough time to get anything but coal-black shadows and chalky highlights. When the lighting is correct, the color of the skin can be seen everywhere and the shadows will not look much darker than the lighted side: in these circumstances the exposure will be short and the result soft and yet brilliant.

**The Camera.**— Successful portraits can be made with any instrument capable of being set for time exposures. Even the cheapest box-form cameras with  $f:16$  meniscus achromatic lenses and a portrait attachment will make fair pictures if the lighting and exposure are well managed. A folding kodak or camera is used with satisfaction by thousands of amateurs. The more elaborate instruments, with rise and fall of the front and vertical swing back (or its equivalent, the

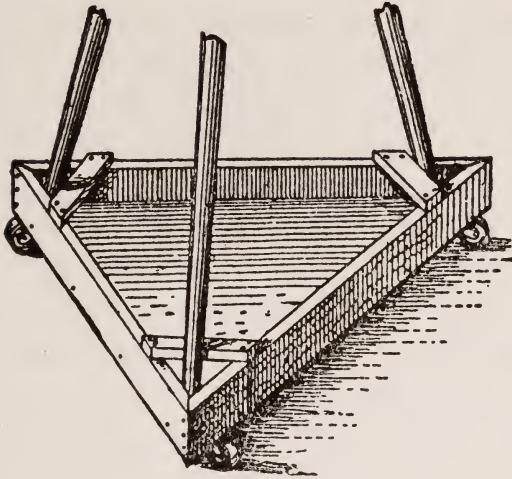


Fig. 1

swing bed), of course, give a greater range, but the ordinary camera is sufficient. An  $f: 8$  rectilinear is excellent, and, if the bellows is long enough, one can make very good portraits by using the rear combination alone. This works at  $f: 16$  and gives an image twice as large as the whole lens at the same distance, or one of the same size at double the distance, thus avoiding foreshortening from having the lens too close to the sitter.

**Camera Support.**— A tripod is as good as anything if it can be extended or folded so as to bring the lens about on a level with the mouth of the sitter. It is much more convenient if provided with a truck. See Fig. 1. This useful contrivance, which permits one to slide the camera backwards or forwards or sideways, without getting it out of adjustment, we recommend to all who practice home portraiture. Being flat it can be set almost anywhere out of sight when not in use. This form can be easily made and will prove a great convenience in moving the tripod without slipping. Mellen's folding tripod stay is very good. Special home

portraiture stands are also made, and can be purchased from any of the large photo-supply houses or reliable second-hand dealers. Tripod trucks can also be purchased ready made at a small figure. A clamp which can be used to fasten a hand camera to the back or arm of a chair is the most convenient support for a small camera, as the chair is rigid and can be shifted quickly without the need of re-leveling the camera.

**The Vignetter.**— The vignetter is a piece of cardboard, part of which, shaped like a half circle, has been cut out; it is notched on the concave edge and designed to cut out such parts of the picture as it may be desirable to eliminate. Being placed much nearer the lens than the sitter, it is itself out of focus and the notching removes any possibility of a sharp line of separation, so that the apparatus vignettes or blends the image gradually into the background, which the vignetter should approach in depth of tone. This is a very useful accessory for bust pictures and should form a part of the equipment of every amateur who practices home portraiture. It must, however, be used with discretion and is scarcely useful except in connection with plain backgrounds. Of course, a vignetter can be purchased from any dealer in professional goods; but it is so simple in construction and easily made of material found in any home that there is no reason why the worker should not make one himself and save the expense. The material needed consists of a piece of cardboard and two pieces of wood, *C* being attached to the base of the camera. See Fig. 2. A vignetter for box cameras can be made of the lower section of a cardboard box, a serrated cut being made in one end, the camera being placed in the bottom of the box with the lens pointing at the serrated end.



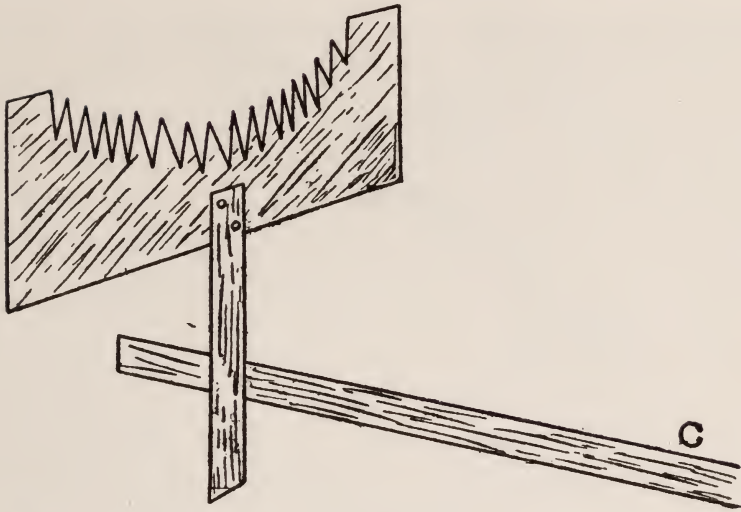


Fig. 2

A commercial vignetter which is particularly adapted to amateur use is simply clamped on the front lens cell; it is adjustable for height and distance from the lens.

**Backgrounds.**— Even in work at home, it is often essential to use an artificial background in order to make bust pictures without including distracting objects. Folding backgrounds can be bought for about \$1.50 from any large dealer in photographic supplies. They do not wrinkle or crack readily, and are convenient to carry when rolled. If preferred, you can easily make your own grounds. First purchase sufficient muslin to make the number of backgrounds desired (we suggest six), and after cutting it up into pieces of the required length and sewing the widths together where necessary, nail one section to the wall. It is very essential that it be drawn perfectly taut to remove all creases. Besides the muslin you will need some sizing, brushes, and the colors. For the sizing, take two ounces of glue and let it stand for about two and a half

hours in just sufficient cold water to cover it. At the end of this time, after draining off the surplus water, add two quarts of boiling water and stir until completely dissolved; dissolve an ounce of crystallized alum in two pints of hot water and stir it in with the glue. Thin the mixture with six quarts of cold water and the sizing is made. Do not use until cold. As for the brushes, they can be those used by painters, but it is wise to select a couple of good quality and so bound as not to shed the bristles. For the colors, the following material will be needed: three pounds of sifted whiting, about an ounce of brown soap (the commonest kind is good enough), some dry lampblack and a little alcohol. Into enough of the hot sizing to make a thick paste stir the whiting until all signs of lumpiness disappear, when the brown soap, previously dissolved in a quart of hot water, should be added. This forms the basis of the working color. The lampblack and alcohol, made into a paste, furnish the various shades. Now add the lampblack to the whiting mixture little by little until a good gray shade is obtained. Of course, the proportion of lampblack and whiting can be varied according to the particular shade preferred. At this stage we have three separate mixtures on hand besides the sizing — to wit, white, black, and gray. Into both the “white” and the “gray” pour hot water to bring them to the consistency of whitewash. They will turn into a jelly as they cool. When cold, thin by adding to each a quart of cold water. Now for the actual painting of the backgrounds.

Size the muslin, putting on a liberal coat. When dry, which will take between two and three hours, paint it all over with the gray color, working quickly. The black and the white can then be laid on according to any

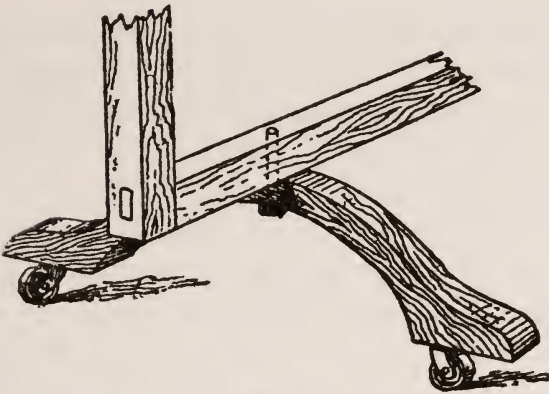


Fig. 3

design which you may fancy. A good way to start is to put a daub of the white in the center and with a blender (which can consist of a wad of cotton or rags rolled into a ball and covered with a piece of clean linen saturated with water) work the tones or shades into each other so that no lines of demarcation are visible. Every once in a while note the progress of the work by viewing it some feet away and touch it up, where and if needed, with either the black, white, or gray, as the case may be. By the bye, reserve one brush for each color, taking care to keep the black brush out of the white and vice versa. When the background is dry it is ready for use and should be wound around a wooden roller and stood in a corner of your darkroom or some other convenient place. In fact, half a dozen such grounds will occupy but a very small space.

**Background Carrier.**— Whether you use a purchased background or a homemade one, a carrier will prove a great convenience. A cheap and serviceable light background may be made out of a piece of unbleached muslin tacked on a frame about 6 x 6 feet, the muslin extending along the floor about six or eight feet more, to

prevent the showing of a line of separation between the wall and the floor. This extension is rolled up on an ordinary curtain pole when not in use and held on the frame by hooks, and the frame slides in behind a bed or a book-case when not in use.

The frame is supported by bracket feet on casters, held to the frame by bolts which permit them to turn parallel with the frame itself when stowing behind the bed. The sketch, Fig. 3, will explain the construction. The corners may be stiffened if desired by screwing in small iron brackets.

**Side Reflector.**— If you have either a room which you can use exclusively for portraiture, or plenty of space to store your apparatus, we would recommend that the reflector (a sheet or a piece of white material) be tacked on a frame specially made for the purpose. Fastened on all four sides, it is kept taut and free from creases. It is well to brace the frame at the corners to make it more rigid. Within limits, the size is a matter of personal choice, but we would suggest 5 x 5 or 6 x 6 feet as suitable and quite convenient to handle. If circumstances are such as to make it desirable to take a picture elsewhere than in the room usually used — as, for instance, on the porch, in the garden, or beside the house — a too cumbersome reflector would likely prove a nuisance, and if the door happened to be low, it might not be possible to pass it through at all. The reflector may be mounted on two blocks of wood so as to stand alone when required, but this is by no means necessary.

The reflector is to be placed opposite the window for the purpose of throwing light on the side of the sitter's face farthest from the window or skylight, thus avoiding the harsh effects which otherwise are inevitable. In

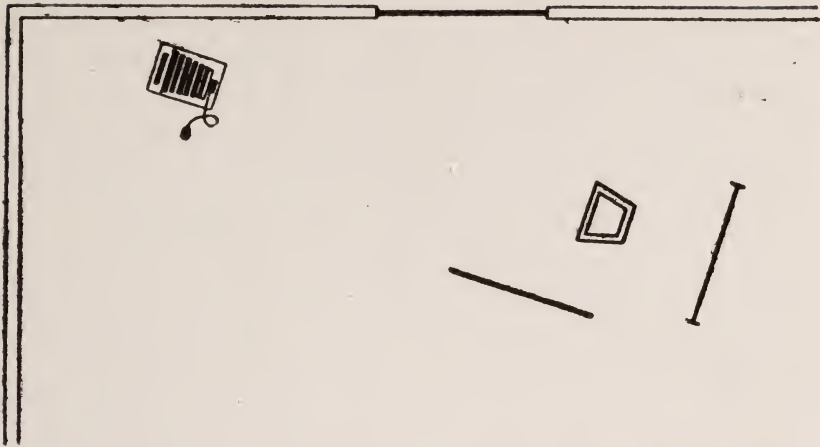


Fig. 4

short, this accessory serves to help distribute the light so that one side of the face will not be black while the side nearer the window is white and chalky. The best position and angle for the reflector will be referred to in a later paragraph.

**Types of Daylight Lightings.**— For practical purposes the forms of lighting which can be secured at an ordinary window are two, broad or three-quarter, and Rembrandt. The diagrams illustrate the arrangement of the apparatus. The different accessories are the same in all diagrams so that lettering is unnecessary. The camera is shown clearly. The reflector is shown as a straight line. The background is indicated by a straight line with a short line at right angles to each end, representing the cross pieces at the base. The position of the sitter is indicated by the four-sided figure intended to represent a chair seat, the direction in which the broader (front) side faces showing the pose of the body. It must, of course, be understood that considerable latitude in placing the chair is per-

missible, for as a rule the body should not be square to the camera. One shoulder is generally nearer the lens than the other, and the head is turned towards or from the light until the best view of the features and the proper lighting are obtained. Fig. 4 illustrates the arrangement of the "studio" for a broad lighting.

Taking this particular lighting more in detail, the window (represented by the single line in the wall) is covered with an *opaque* cloth to the same height as the top of the sitter's head. The reason for this is that the light should come from an angle of 45 degrees in order to illuminate the features to good advantage. The absence of a top light, or more properly speaking, the inclusion of light from the bottom part of the window as well, is responsible for most of the faulty lightings turned out in ordinary home surroundings. Place the chair in line with the farther casing of the window and as far into the room as the window is wide. Let the sitter settle himself comfortably in the chair and have him turn his head until the light from the window crosses the bridge of the nose and falls upon the farther cheekbone. Now observe the eyes: a small, round catch-light will be seen just under the upper lid in each, if the lighting is right; if not, have the head turned slightly until the catch-light is seen clearly in both eyes. Next look at the shadow cast by the nose on the upper lip: it should come not more than half way down the lip and be connected by an area of halftone with the shadow along the lower jaw. Finally, observe the *color* of the skin in both highlights and shadows. Unless you can see the local tint of the sitter's complexion in both, the lighting is too harsh. It may be necessary to stretch cheesecloth over the window to diffuse the light, thus

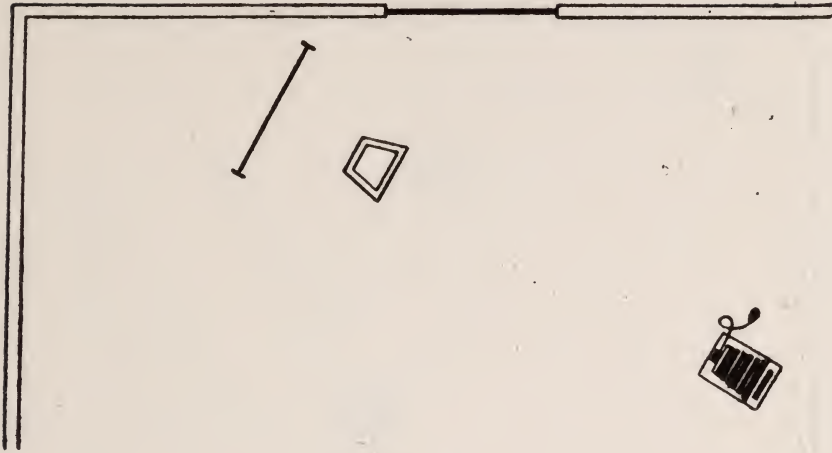


Fig. 5

softening the highlights, or to use more reflected light. Note the position of the reflector in front of the sitter and at such an angle that it does not cast false light into the shadows on the back of the head. If it is brought too near, a sort of chalky quality of the shadows will be created by the strength of the reflected light; so be sure that it is far enough away merely to lighten the shadows just enough to bring out the *color* of the skin. Now adjust the camera until the lens is about on a level with the mouth of the subject, with the lens lowered in its front if necessary to bring the top of the head in proper position on the plate, and focus so as to get the catch-lights perfectly sharp. It is just here that a camera provided with a vertical swing back comes in most handily, for by using the swing one can focus both the nearer and the farther parts of the body at the same time, the camera back, of course, not being vertical. The best spacing to work for is with the head of the sitter near the top of the picture space. Given such a lighting, the exposure will be in the neighborhood of from 2 to 6

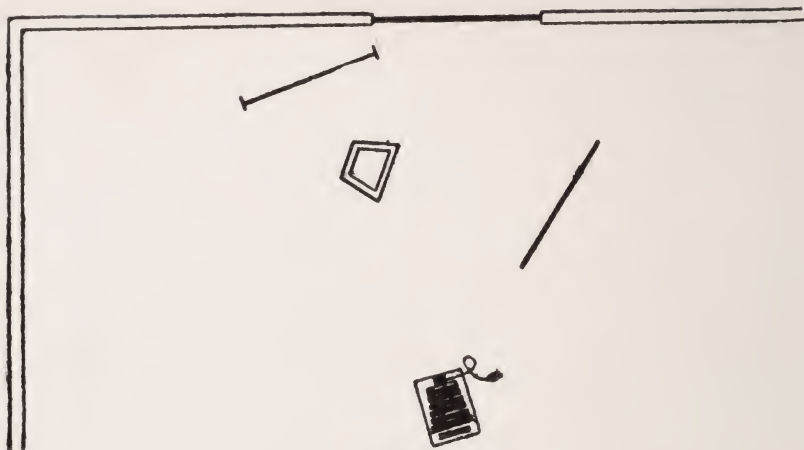


Fig. 6

seconds with a rapid rectilinear lens working at  $f: 8$  on a plate of speed 2 in the American Photography Exposure Tables (Watkins 350 or Wynne F 111). By using plates of ultra rapidity, the time may be reduced to about half these figures.

Users of fixed-focus box or folding cameras will have to depend on trimming the print for the final spacing of the subject; but this is easily managed, particularly if the prints are made by enlargement. See *Practical Photography* No. 5, "How to Make Enlargements."

**Rembrandt Lighting.**— In Fig. 5 we have the arrangement at the same window for the so-called Rembrandt or shadow lighting. Here the sitter is nearer the window than is the camera. The placing of the chair must be experimented with until the most pleasing view is found. As before, the light should be allowed to cross the nose to the shadowed cheek; but the reflector can be dispensed with if the room is small and there is on this account enough diffused reflected light to allow one to see the color of the skin in the deepest shadow. If not,



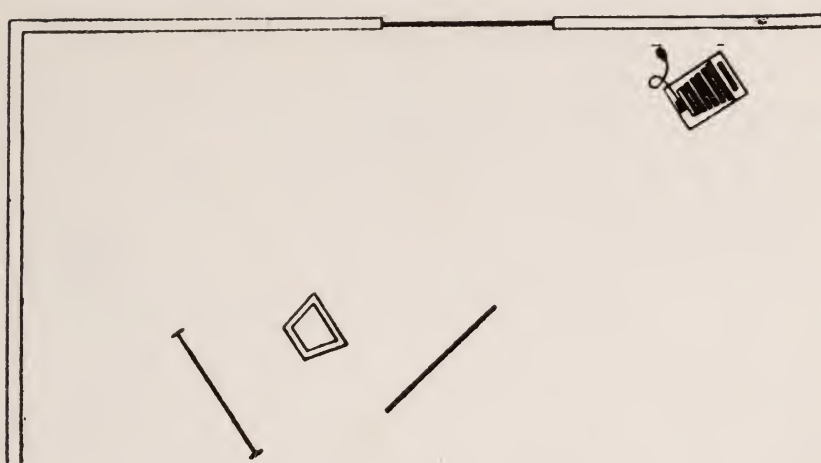


Fig. 7

use a reflector about 6 feet from the subject. The next figure, 6, shows the arrangement for a profile Rembrandt lighting. The sitter is here almost directly between the window and the camera, and a reflector, placed about as shown, is useful to prevent too harsh contrasts. To prevent halation or flare a lens hood must be used. The exposure for both of these positions must be fully double that needed for the arrangement in Fig. 4.

Fig. 7 illustrates another form of broad lighting, with the sitter farther back from the window. In such a position the contrasts are less intense on the face, on account of the light being more diffused. Shorter exposures are therefore possible.

**Window-Seat Lightings.**— Very often the window-seat offers one of the very best situations for a home portrait, for the surroundings are simple and the sitter can be posed as if occupied with some entirely natural pursuit, such as reading, tending plants, or what not. Fig. 8 is intended merely as a suggestion to keep the camera as near the wall as possible, so as to work nearly

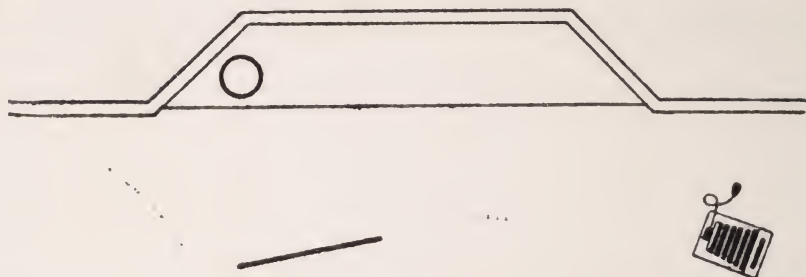
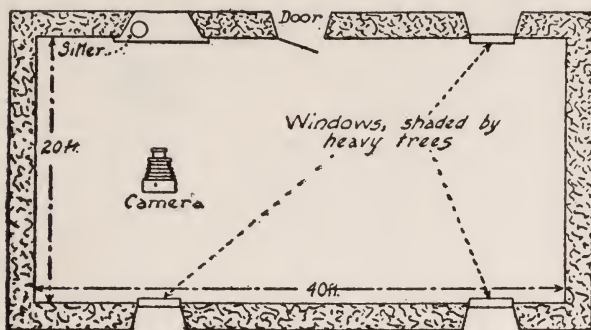


Fig. 8

with instead of against the light; and the reflector is shown at some distance from and in front of the subject. In this case the sitter is represented by a circle.

Paul Lewis Anderson, the well-known pictorialist, gives the following methods for handling window portraits even when direct sunlight is entering the window. We abstract from the July, 1911, issue of *American Photography*. A single achromatic lens is preferred because of its lesser liability to flare — for instance, the rear combination of an ordinary rapid rectilinear or one of the single “semi-achromatic” lenses, commonly called “soft-focus” lenses. A ray-filter should be used in order to reduce the proportionate intensity of the lights, and this presupposes a color-sensitive plate, which should be double-coated or backed to reduce halation. A soft-working developer without bromide should be employed, with at least double and preferably four times the usual amount of water. Care should be taken not to overdevelop, it being preferable to underdevelop and subsequently intensify, if necessary, rather than to carry the original development too far. Should the slightest sign of fog appear, the plate should be placed in the hypo as soon as possible, and, if necessary, intensified after it is dry. The class of negative to aim for is one that shall have full detail in the shadows, thin high-



*Arrangement for Window Portraiture*

Fig. 9

November.  
11<sup>30</sup> A.M.  
Strong sunlight.  
Dark walls.  
No reflector or  
supplementary  
lighting.  
6½ x 8½ Orthonon plate.  
10½ single achromatic  
lens, f/8.  
B. & J. Ideal ray filter (2).  
15 seconds exposure.  
Meral developer.  
Platinum print.

lights, and almost clear glass in the lowest tones. Of course, such a negative should be printed in diffused light, either in shadow or with ground glass or tissue paper over the printing frame. Fig. 9 shows the arrangement. Mr. Anderson remarks that the same result may be had by giving a brief exposure for the lights, say three or four seconds, and a flash, consisting of about 15 to 30 grains of a good flashpowder, care being taken that the flash is far enough away from the subject to give a diffused lighting and not enough flashpowder employed to overpower the natural light and cast shadows in the opposite direction. To make the entire exposure by natural light is, however, preferable, if at all possible. Data refer to illustrations in original article.

In the same issue, H. M. Long recommends the following procedure with bromide. The arrangement is similar to that shown in Fig. 9, and the exposure is timed for the deepest shadows, using a reflector at such an angle that it shall throw light upon the deepest-shaded part of the figure. Immerse the plate in 10 per cent. solution of potassium bromide for several minutes, drain, and put into the developer. Method No. 1 is to

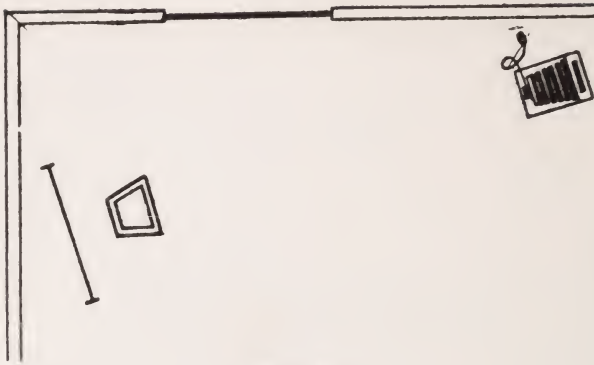


Fig. 10

use the ordinary tube or package developers, for instance, M.-Q. tubes, dissolving the contents in three times the amount of water called for by the label. Method No. 2 is for those who use a three-solution developer, such as the Seed or the Cramer *ABC* pyro or the Central three-solution pyro-metol. In all of these the sodium carbonate is in a separate solution. Mix the developer with the usual quantities of the reducer and of sodium sulphite, but add only 1 *drop to the ounce* of the carbonate solution — just enough to open the pores of the gelatine and allow the reducer to act.

A restrainer for preliminary soaking of the plate which acts in thirty seconds is:

Copper sulphate.....	10 grains
Potassium persulphate.....	20 grains
Nitric acid.....	50 minims
Water.....	40 ounces

The film should be rinsed under the faucet after using this formula. Use a strong developer, and do not develop too long.

**Portraiture in a Small Room.**— In Figs. 10, 11, and 12 are given plans of small rooms such as one often finds, with the window so near one of the end walls that

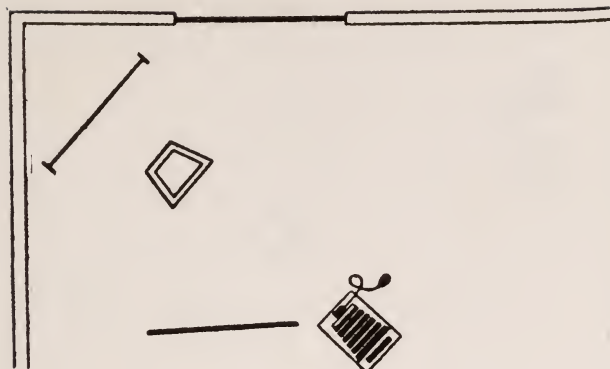


Fig. 11

the positions of sitter and camera are restricted to those shown in the diagrams, or something similar. In such cases, however, with reasonably light colors of wall-paper, there is seldom need of a reflector.

**Portraits Outdoors.**— When one attempts to make portraits outside of the house, the ordinary snapshot methods often suffice, but if a more formal pose is desired, a corner formed between the main portion of the house and an ell is most suitable. Generally a background will be needed. Two arrangements are suggested in Figs. 13 and 14, the choice depending on the direction from which the light is coming. In the shade, with good sunlight elsewhere, it will usually be found that a position close to the wall of the house gives a lighting free from the objectionable flatness of most outdoor illumination of the face. There is, of course, no reason why the home portraitist should not be able to use direct sunlight on the face if the model can refrain from squinting, and double-coated ortho plates are used; but most pictures of people in sunlight are too harsh and unpleasant to be attempted without a thorough understanding of the problems involved.

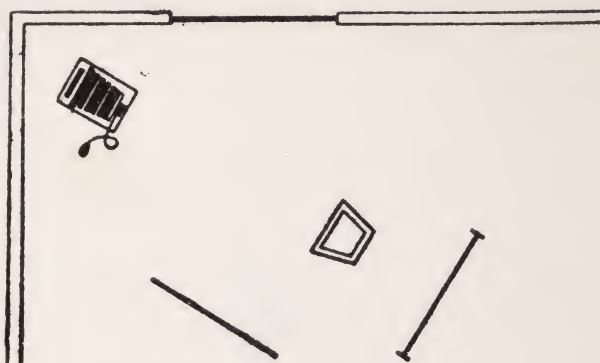


Fig. 12

**Garden Work.**— If a suitable background — one free from spottiness — can be found in a garden, very characteristic and interesting portrait studies can often be made, though the method is perhaps more suitable for groups and for genre studies of children than for formal portraiture of the single figure. The greatest difficulty is to secure enough relief in the lighting of the face. An opaque screen suspended at one side in any convenient manner will wonderfully improve the effect by subduing the illumination on that side. There are, of course, certain spots in almost every garden which either very early or very late in the day, when the sun is low, will furnish without the use of any accessories an almost perfect light on the face. In general, the home portraitist will find that when a garden lighting looks right it will photograph attractively, if overtime is avoided.

**Technical Points. The Height of the Lens.**— Having very briefly pointed out some of the arrangements possible with daylight illumination, let us now take up in detail the many little things which make all the difference between success and failure in portraiture.

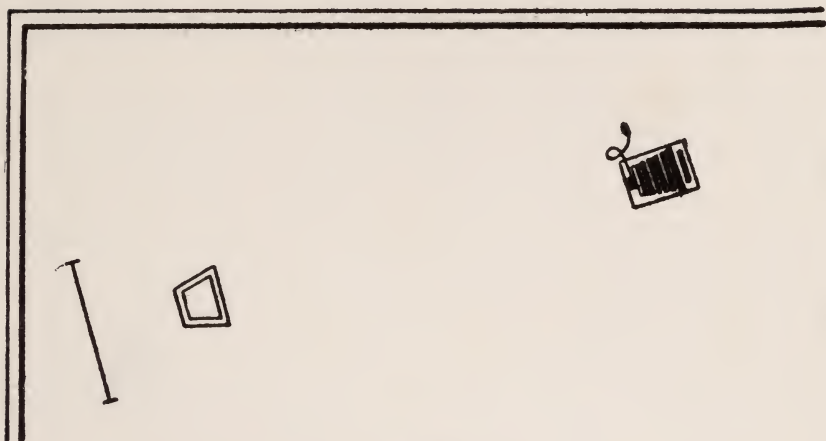


Fig. 13

The height of the lens has already been mentioned. If it is higher than the mouth, too much prominence will be given to the upper portion of the head, at the expense of the chin. The neck will also be unduly shortened and the shoulders will have a hunched-up appearance. If the lens is too low, the under side of the nose will be shown, with the aperture of the nostril looking much more prominent than it is in reality. On the other hand, the lens may be brought to the level of the chest for a standing full-length figure; and if the subject is very low, as a child playing on the floor, the camera must be brought down so that it is about opposite the middle of the sitter. It is here that the reflex type of instrument shows its greatest convenience.

**Poise of the Head.**— When settling the pose, direct the sitter to look at some object beyond the camera and at such a height that the head is neither inclined too low nor “tossed” in the air, for any deviation from the normal carriage is sure to look exaggerated. As a general rule, with the lens at the height of the mouth, an object on a level with the sitter’s eyes should be chosen

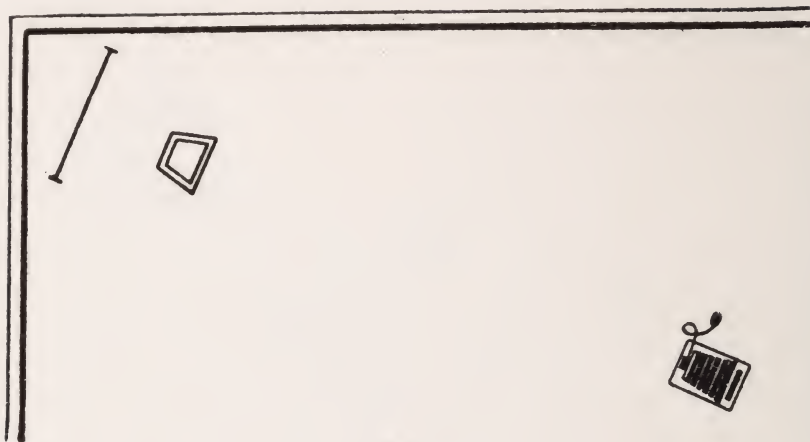


Fig. 14

for the "eye-rest," as it is technically called. If the head is tipped down, the length of the nose is increased and mouth and chin are reduced in size: if the head is thrown back, the nose is shortened and mouth and chin enlarged. Similarly, the head should not be allowed to sag to one side, unless one desires to depict the sitter as if falling asleep: nor should the chin be thrust forward and the head drawn back to suggest aggressiveness without great care not to overdo the matter and get distortion.

**Effect of Tonality of Background.**—A light-colored ground makes every tone in the subject seem darker by contrast than in the case of the same subject against a dark ground. It may be stated as a rule that the ground should not contrast too sharply with the outline of the sitter. The outline of the figure may at times with benefit be allowed to blend into the background. Dark grounds are most effective for men; medium ones for ladies in most costumes, particularly morning gowns and negligees of a soft, clinging character; light, almost white ones, for very light costumes and ladies and



children dressed in white. The dark ground gives more importance to the head. It should not be used with very light clothes, as it is likely to bring out the costume too strongly at the expense of the face.

**Use of the Reflector.**— The diagrams must not be slavishly followed. In every case it is necessary to move the reflector around until it brightens up the shadows enough and not too much. Keep it in front of the sitter so that it will be a part of the main lighting. In an emergency, a sheet thrown over a stepladder or a chair is better than one hung on a wall, because it can be moved around. The physical law at the bottom of the matter is: The angle of reflection is equal to the angle of incidence, that is, if the light from window falls on the reflector at an angle of 20 degrees it will be reflected to the sitter at the same angle.

**Top Lighting.**— Whenever an ordinary window is used for a bust portrait, unless the lower part is covered with an opaque cloth as high as the top of the sitter's head, the illumination will be too strong on the lower part of the figure. The light must fall from an angle of 45 degrees. When it is correct, the shadow of the nose will come about half way down the upper lip. If it comes lower, pin the cloth a little lower down; if not so low, a little higher up. Similar principles apply to outdoor lightings, making it necessary to cut off as much light as possible from one side in order to get some effect of shadow.

**Flashlight Portraiture.**— Taking portraits by flashlight has one great advantage over the daylight method because the intensity and direction of the lighting can be absolutely controlled by the operator. The failures are due to insufficient diffusion of the light. The ap-

paratus needed is such as can readily be improvised, in most cases merely the flash material in sheet, cartridge, or powder form, together with a flashlamp for the latter, and a piece of cheesecloth to diffuse the light. Simple lamps are sold by all dealers. Some use cartridges; others, loose powder. More elaborate lamps with telescopic stands are sold at greater prices. Whichever style is used, the reader will find many useful hints in the free booklet, "By Flashlight," obtainable at Eastman shops.

**The Principles.**— To get a good flashlight illumination, the flash must be set off above, to the front, and to one side of the subject's head. The light must fall from an angle of 45 degrees and cast the shadows in about the way already indicated in daylight work. The best way to find the position for the lamp is to take a candle, in a darkened room, and hold it at different points until the effect is right. The nose shadow must come about to the middle of the lip and the light must cross the bridge of the nose and fall on the cheekbone. In small rooms of light coloring, reflectors may not be needed, but in most instances they should be employed about as in daylight work. In addition, it is almost always necessary to diffuse the light by hanging in front of it a piece of fireproofed cheesecloth. The following formula for fireproofing is taken from *American Photography*.

Soak the cloth in the following mixture at 86 degrees Fahrenheit:

Ammonium sulphate . . . . .	8 parts
Ammonium carbonate . . . . .	2.5 parts
Borax . . . . .	2 parts
Boracic acid . . . . .	3 parts
Starch . . . . .	2 parts
Water . . . . .	100 parts

Dry, and iron with a moderately hot flatiron.

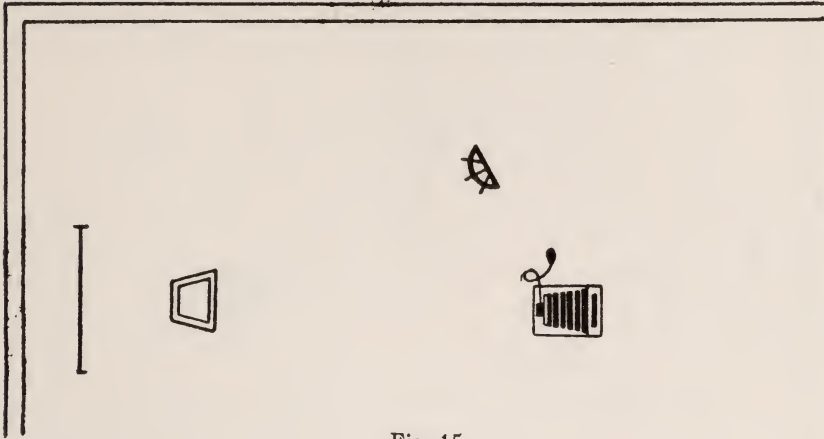


Fig. 15

**The Reflector.**— To avoid harsh results not only is the diffusing screen necessary, but also a reflector behind the flash itself, as well as a reflector to throw light into the shadows, just as in daylight work. The most convenient reflector behind the flash is a sheet of white mounting card, for it is seldom difficult to arrange an extra tripod to hold a wooden base to carry the card, the lamp, and the diffusing screen, or to improvise a proper support on the household stepladder. Most of the failures in amateur flashlight work are due to the neglect to provide the accessories.

**Flash Sheets.**— The Eastman flash sheets give a time flash. Used with the holder, they are similar in effect to a “blow” flashlamp for pure magnesium powder. They can be pinned up almost anywhere away from inflammable hangings and give excellent results if the sitters are warned that it is to be a time exposure. In any case, do not let the subjects look at the flash.

**A Smokeless Flash.**— By mixing pure powdered magnesium with an equal volume of guncotton smokeless powder, such as DuPont’s shotgun smokeless, an

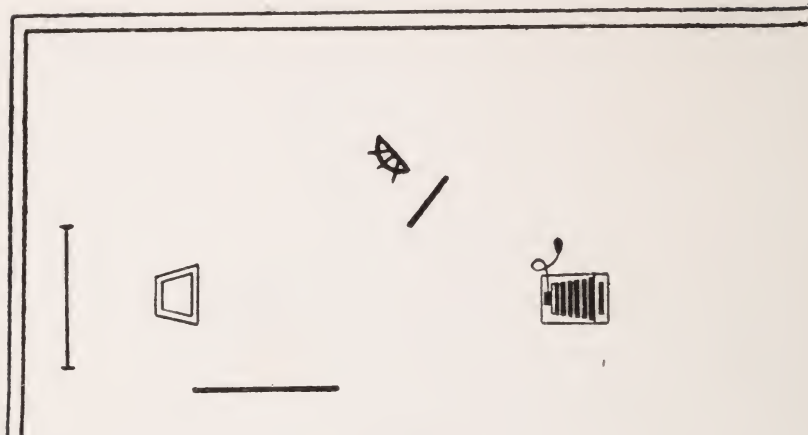


Fig. 16

excellent smokeless time flash can be made. Fire it on a tin plate, preferably in a long train on a tuft of absorbent cotton pulled out thin. A dozen exposures of about three drams' bulk of each of the ingredients may be made in quick succession without injuring the negatives by smoke in the room. The heat generated is very intense, and the residue remains on the tin plate instead of passing into the air as smoke.

**Flashlight Lightings.**— In the diagrams illustrating flashlight lightings, two new accessories are introduced, *i.e.*, the flash — represented by the device which looks like a portion of a cog wheel, suggesting the spreading of the light from the center, and an opaque screen to shade the lens from the flash — represented by a short heavy line. Fig. 15 shows the arrangement for a simple broad lighting effect in a small room, with screen and flashlamp, which should be about 2 feet in front of, 2 feet to the side, and 3 feet above the head of the sitter. Fig. 16 indicates about the same effect with the addition of a reflector. In Fig. 17 we have the arrangement for a Rembrandt effect, the lamp being placed somewhat

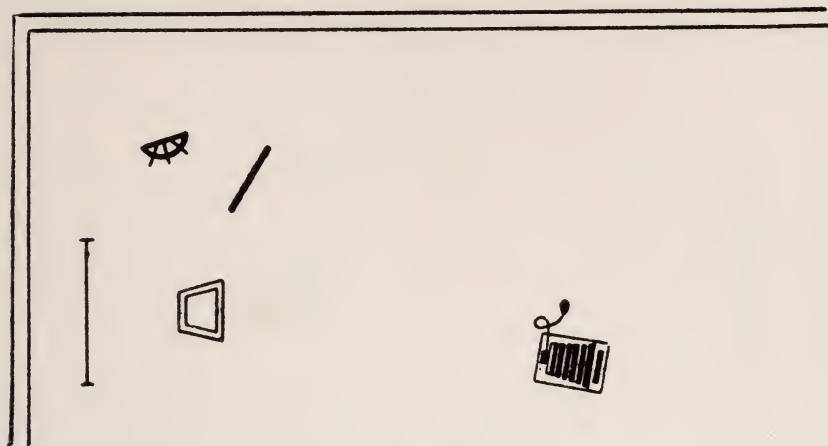


Fig. 17

behind the sitter, so that the face is thrown into shadow. By varying the position of the subject's head and body with reference to the camera, almost any modification, from a line light along the profile to a complete shadow effect, can be made, the exact effect, in each case, being worked out in advance with a candle in the darkened room. When making the actual exposure, however, take care to have all the lights burning, as long as they do not come within the field of the lens, as a flash made in a lighted room does not affect the eyes of the sitter and cause staring effects (except in the case of a time flash).

**Making the Exposure.**— After the pose, arrangement of lamp and accessories, and the other details have been settled, measure the distance from lens to eye of sitter with a tape measure and adjust the focus accordingly, or get an assistant to hold a match or a candle about in the plane of the nearer eye and focus the flame sharply on the ground glass. While making the final preparations, keep up a running fire of talk in order to keep the subject from knowing just when the flash is to occur.

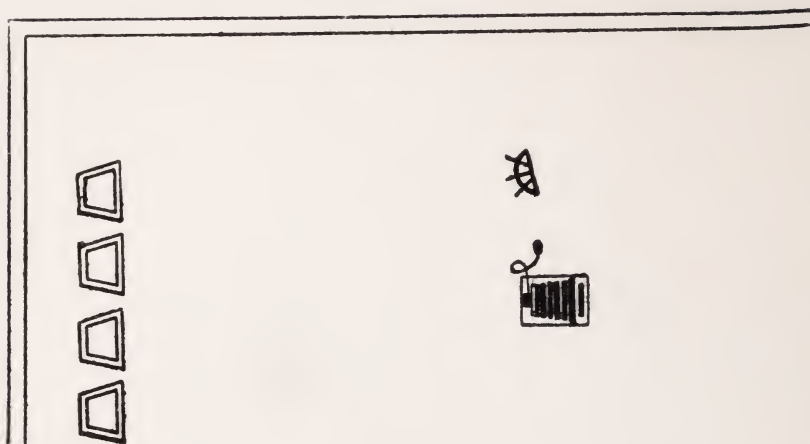


Fig. 18

Having set the lens at its largest aperture and the shutter on time, see that a new film is in position or the plateholder slide withdrawn and grasp the bulb, preferably with the hand held where the sitter cannot see it. Release the shutter and immediately afterwards ignite the flash. The more elaborate lamps are provided with a long tube and a by-pass, so that one pressure first opens the shutter and then sets off the powder.

**Other Lightings.**— Fig. 18 suggests an arrangement for a small group, the lamp being put as near the sitters as possible without appearing in the picture. The most important point here is to get the light high, so that the direction will be 45 degrees, as already noted. Most failures in group work are caused by having the lamp too low. A lamp with a folding metal stand extensible to a good height is almost a necessity if much group work is undertaken. Fig. 19 is a firelight effect, the flash being put into the fireplace far enough back to be out of sight of the lens. A second (smaller) flash is employed close to the camera to throw some light into the shadows cast by the main flash and thus avoid

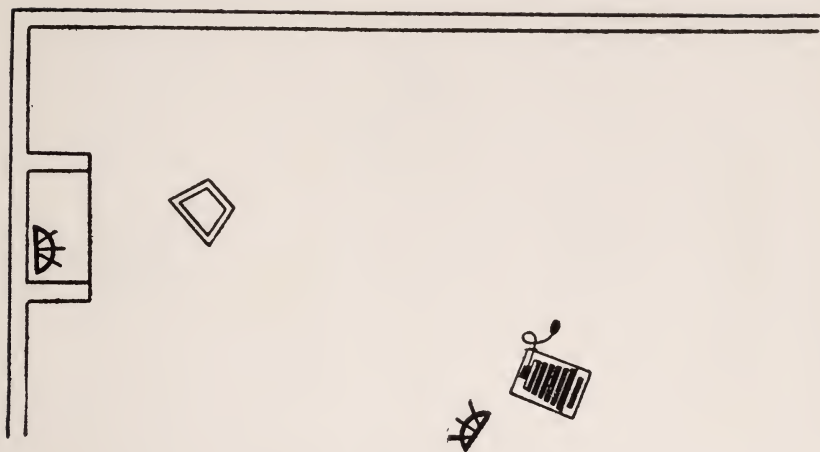


Fig. 19

the excessively harsh contrasts usually seen in work of this character. Fig. 20 illustrates a method of taking a group when the camera has to be at a distance from the sitters, the flash in this case being put considerably ahead of the lens and shielded by a large opaque screen, which at the same time acts as a reflector. In Fig. 21 is a suggestion for another form of Rembrandt lighting, with reflector. Finally, in Fig. 22 is shown a method of making silhouette portraits. The sitter is placed in another room with the flash directly behind and a sheet is stretched without wrinkles over the doorway. It is evident that a soft image without detail will be projected on the sheet. If a sharp image is wanted, the sitter must be posed on the other side of the sheet, that is, in the same room with the camera.

**Amount of Powder Needed.**— Full directions come with each package of compound flashpowder, some taking as little as three grains for a bust portrait with a lens working at  $f: 5$ . The amount, of course, must be doubled for each size smaller stop. Thus, with an  $f: 8$  rectilinear, twice as much powder would be needed as

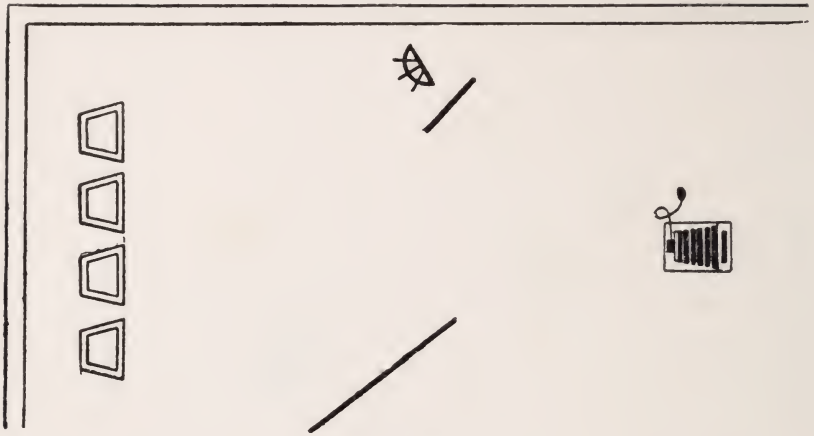


Fig. 20

for the  $f: 5$  lens, provided the distance from flash to sitter were not altered. If the flash is farther from the sitter, the amount of powder needed increases not directly, but as the *square* of the distance. Thus, if 5 grains is enough at 4 feet, on moving the flash to 8 feet, *i.e.*, double the distance, the charge would have to be  $4 \times 5$ , or 20 grains. The variations needed for different rooms are tabulated in an article by J. G. Boyd in the June, 1912, issue of *American Photography*, as follows:

Color of Ceiling	Color of Walls	Reflecting Value
Very light	Very light	100
Very light	Medium	75
Medium	Medium	60
Very light	Very dark	50
Medium	Very dark	35
Very dark	Very dark	20

From this table it is evident that the powder charge must be increased according to the color of the room decorations, a room with medium ceiling and very dark walls requiring 65 per cent. more powder than one done all in white. A few experimental exposures will quickly put the reader on the right track.



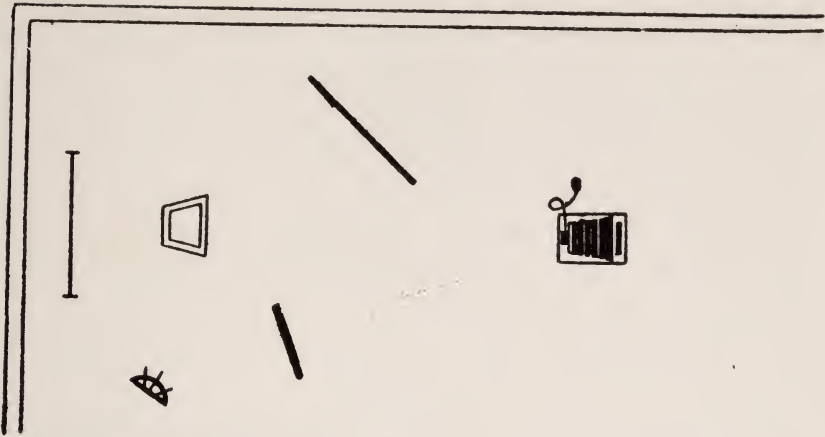


Fig. 21

**Portraiture by Artificial Light.**— Until recently, only permanent studios could use any form of artificial light except the flash; but recently there has been placed on the market a special Cooper Hewitt outfit for home portraiture. It is portable and convenient to operate. It consists of two 20-inch Cooper Hewitt tubes mounted in an aluminum case with tripod and flexible wire for connecting to the electric supply. The outfit folds up into a case about the size of a suitcase and weighs less than 50 pounds; both direct and alternating current types are supplied. One user says: "I employ it mostly in conjunction with insufficient daylight, as cloudy weather, or in rooms poorly lighted. I have made a successful 8 x 10 group of a mother and two children at 4 p.m. on a rainy day in December. I gave 2 seconds at  $f: 8$ . I have also done excellent work by the lamp alone, shutting out such daylight as I could with the ordinary shades on four windows."

This outfit would seem to open up a new field for the home portrait worker, as the cost is not great, the current consumption is small, and the exposures are

short, particularly if color-sensitive plates or films are employed. It is free from the smoke nuisance of compound flashpowders and should make the operator independent of daylight under bad lighting conditions.

R. D. Gray, of Ridgewood, N.J., manufactures a "Studio Parallax" lamp consisting of a 40-mirror reflector using a large Mazda bulb. It is stated that exposures of about 2 seconds on ortho or iso plates give full-timed results. The mirrors are so calculated and arranged as to give a diffused light.

**Flashbags.**— Most makers supply flashbags for confining the smoke of the compound flashpowders and at the same time diffusing the light, thus avoiding the tendency of flashlight illumination to give harsh effects. These bags are particularly desirable for large groups, as at banquets. *The Photo-Miniature*, No. 85, gives the following directions for making a flashbag.

"The Eagle Flashbag consists of a rectangular envelope of close-woven, fireproofed unbleached sheeting, suspended on four cross rods attached to a vertical standard, and having on top a folding flap of peculiar construction which expands with the released gas, smoke, and magnesium oxide and automatically acts as a cut-off from the rest of the bag. After exposure, the bag and the lamp can be removed bodily from the scene of operations, the smoke and other products having been completely trapped. The whole apparatus, if neatly made, should be extremely portable and fold up into a small compass.

"To construct such a bag, provide a wooden or a metal standard from four to six feet high, or any desired length. To the top of it affix an inverted juvenile wooden top, in which bore four holes for the reception

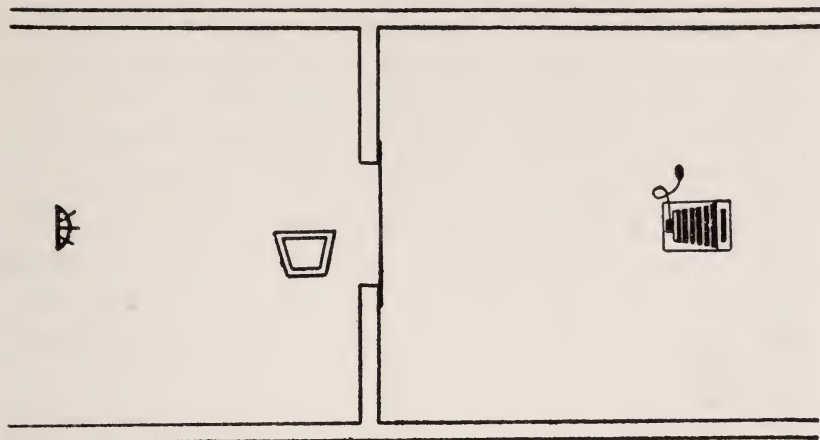


Fig. 22

of the metal cross rods. These rods support the flexible bag, which should be weighted with lead sinkers weighing four or five ounces each to keep it in position. The dimensions of the bag should, of course, be chosen according to the size of the lamp with which it is to be used. For the Eagle lamp (George Murphy, Inc.) they should be 5 feet wide, 6 feet deep, and 3 feet high, the top fold measuring  $2\frac{1}{2}$  feet. For the Nichols lamp they should be 4 feet wide, 3 feet deep, and 5 feet high, the top fold measuring  $2\frac{1}{2}$  feet. The width of the flashbag should always be 2 feet more than that of the tray of the lamp. For magnesium lamps the bag should have a closed bottom with an opening in the back about 1 foot from the bottom, large enough to allow the lamp to be inserted and held therein during the exposure." Care should be taken to have the bag sufficiently large for the flame. . . . Not more than half an ounce of powder should be used. Wash the bag and re-fireproof after about four exposures, or it will get clogged and cut off the light,

**Development.**— It makes little difference what particular developing agent you use, as any one of them, if properly handled, is capable of yielding a perfect negative. In expert hands, pyro is susceptible of easy adjustment and works hard or soft, according to the number of grains to the ounce of solution. Most amateurs, however, objecting to the stain which pyro leaves on the film and the fingers, prefer the newer, cleaner working agents. As in home portraiture under-exposure is more likely to occur than over or even normal exposure, there is considerable advantage in using an extra quantity of water. The method of development is far more important than the actual formula selected.

The present day method of development is to make use of a developer of known strength, whose rate of action at known temperatures is constant. Thus, two negatives of the same contrast may be produced by a proper observance of the factors of developer strength, temperature, and period of development. Investigators have tabulated the results of many experiments along these lines, so that today it is necessary only to know the development speed of a plate or film, the strength of the developer and its temperature, in order to determine the development period that must be allowed to bring a negative up to the desired degree of contrast. One of the most convenient forms in which this information can be secured is furnished by our publishers under the name of the Thermo Development Chart. This gives formulas for making up stock solutions of developer, and the proper dilution of each when developing different brands of plates or films — which have different rates of development. Having made up

the developer and ascertained its temperature, the worker looks in a time and temperature table, also on the chart, which shows the time to be allowed for development. By making use of a chart of this sort the worker can produce negatives which do not vary in contrast, even though using several different brands of plates.

Experienced workers have different ideas of what constitutes correct contrast in a negative. Such a device as the Thermo Development Chart is a fine addition to the outfit of such workers, because the scheme is entirely relative. After making a negative or two, if the contrast of the negative is too great or too little, it will be known that the whole classification can be shifted up or down one degree of dilution. The simplicity of making negatives by this method, and the consistency of results, make it the best for use by the beginner or advanced worker. The day has gone that brought to the beginner the idea that he could improve the character of the negative by any manipulation of the developer during the period of development. It is true that an overexposed plate can be developed in a solution containing more than the normal amount of potassium bromide, with an improvement in its chemical quality *provided the bromide is added before development has begun*. However, in a discussion of home portraiture, where overexposure is seldom met, it is not necessary to take up the problem of developing overexposed plates. The worker will do best to use a Thermo method, making a few trial negatives to assure himself that he is producing negatives that are soft and full of detail — a standard to adopt for all classes of work.

**Retouching.**— It is an exceptional negative which will print exactly as one desires, without first being worked over somewhat by hand. The amateur looks askance at any negative which seems to need more retouching than the filling in of an occasional pinhole or scratch. Yet it is not difficult to do this part of the work, although the first few attempts will probably be more or less disappointing. The fault with the first attempts will be that the retouching has been overdone, rather than poorly done, and as soon as this fact is appreciated, the quality of the handwork will materially improve.

The outfit can be quite simple. Three pencils of first quality, say, H, 3H, and 5H, sharpened to a long tapering point; an etching knife of best steel; a stick of India ink; a bottle of "dope;" a jar of opaque; and a fine pointed sable brush; these few articles will suffice for every kind of retouching, the only other thing needed being a retouching desk, either makeshift or purchased ready for use. As long as the negative can be supported in such fashion that an even light is reflected up through it with sufficient strength to show up all defects and the detail, any device will be satisfactory.

In working, all dark-colored blemishes should be removed first with the etching knife. These should not be scraped off, but shaved off. It will thus be seen that the knife must have a very keen edge, and be of good steel. Be very careful not to go too far, which is the beginner's tendency in etching. After the etching is complete, a drop of retouching dope should be applied to whatever portion of the negative needs careful retouching, and quickly rubbed in with a lintless cloth, such as a clean pocket handkerchief wound over the end

of the forefinger. This must be done quickly — very quickly — so that it can be spread thinly before it has a chance to become too tacky to handle. It must not be rubbed after it becomes tacky, but should be set aside to harden, which will take place in a few moments. Very gentle heating will hasten drying to a hard surface. The doped surface will hold the lead applied with the pencil. This must be applied lightly and evenly, so that individual strokes do not show at all when printing. There are a number of strokes; no one stroke is to be particularly recommended. The individual will soon find that he can handle one or another better than the rest, and he should aim to develop his skill with that one. Some retouchers use very fine dots, placing them so closely that they apparently fill a space solidly. Others interweave a multitude of small figures like an s; others use small circles, while some use a series of carefully blended straight lines. The secret of success with any of them is to make the individual marks very minute, applied with the lightest possible touch, and so weave them together that to the unaided eye, at a distance of a few inches, they do not appear as individual lines, but as a solid mass of color.

If it is desired to block out the background, the sable brush may be charged with India ink and the figure very carefully outlined. Outside of the line of ink, opaque may be applied for a distance of about  $\frac{1}{4}$  inch, and a mask of black paper cut to cover the rest of the background, over-lapping the opaque at least  $\frac{1}{8}$  inch.

Minor defects such as pinholes and scratches can be remedied most simply by filling in with India ink applied with the sable brush. The result will be a corresponding white mark on the print, but this can be

spotted to the color of the surrounding area by using dilute India ink applied very sparingly, with a stippling motion.

The subject of retouching the features of a portrait negative, to alter the modelling and lighting, is one that is complete in itself, and too advanced for the reader of an elementary textbook of this nature. Our publishers recommend "The Art of Retouching and Practical Directions How To Finish and Color Photographic Enlargements," by Robert Johnson, as being the best treatise of the subject that they have yet secured. (Note. Obtainable from our publishers for \$1.25.)

**Printing.**— The print should be soft, somewhat grayish as a rule, and in most cases the scale should be rather short, the highlights not being pure white, the shadows being half black so that all detail is brought out. This condition can be assured by soft development of the plate at the outset; from a soft negative there is usually no difficulty in making a satisfactory print on either the soft or medium grades of gaslight papers. The surface of the paper is quite important. If it has a slight grain, any retouching is less likely to show, while a semi-glossy paper will show up every little blemish. Platinum paper is productive of beautiful portrait prints, but a nearly similar result can be obtained by the use of a "plat" finish gaslight paper.

The simplest method of finishing the print is to make a straight contact print from the retouched negative, using double weight paper, and mounting it in a stock folder such as all dealers have for sale. Such work is mediocre, and can be so very much improved that it pays to be more fastidious. Double printing to secure border effects, plate sinking, enlarging, and vignetting



all play an important part in the production of a home portrait.

**Double Printing** requires the use of two printing frames, with suitable masks gummed to the glass of each, although one frame only need be used if the glass is shifted between exposures. The masks are easily made as follows: Take two pieces of black paper, trimmed to the inside dimensions of the printing frame. Lay them, one atop the other, carefully registered all around, on a drawing board or table, and thumb-tack them flat. In the center of the top sheet draw a rectangle the size of the print which is to be made. With a very sharp knife (a razor blade is excellent) and a ruler, or straight edge, cut out the rectangle, cutting through both sheets of paper. Remove the top sheet and the two rectangles. On the lower sheet of paper lay out another rectangle, say a quarter inch larger all around than that already cut out; cut this out as before. The two cutouts and one rectangle are needed for making the masks. Clean both printing frame glasses carefully, and lay one in the frame, wedging it solidly into one corner. The sheet of black paper with the largest opening should then be laid on the glass and gummed down, registering it in the same corner as the glass. The solid rectangle should then be gummed to the center of the cutout, so that the only clear glass remaining is in the shape of a rectangle  $\frac{1}{4}$ -inch wide all around. Place the back in the frame for a moment or two so that the glue will have a chance to set and the masks will lie perfectly flat. Then place the second sheet of glass over the first and wedge it into the same corner as the first. On this lay the sheet of paper in which the smaller rectangle was cut, and gum it down

so that the edges of the cutout are exactly above the edges of the solid rectangle pasted on the lower sheet of glass. Place the back in place and allow this sheet to set. In removing the glasses, mark the corners which were wedged into one corner of the frame, so that the positions of the glasses may always be registered in the same fashion when used in the future. The method of making the prints with borders is simple. First, make a trial exposure with the portrait negative, to ascertain the correct time. Also make a few trial exposures through the clear glass to ascertain the right time to give to secure a suitable tint *in the same period of development that was given the portrait print*. Having found these times, place the portrait negative over the mask which is wholly open in the center. The paper must be shoved solidly into the corner into which the marked corner of the mask has been wedged, and the first exposure made. This prints the portrait. The paper is then removed, and the same corner registered above the marked corner of the other mask, wedged into the frame and an exposure made through the clear glass border mask. The paper is then removed and developed, and if the two exposures have been rightly made, the border will develop up around the print like a frame. Many variations of this method are possible; the most common are to make more than one border of different tints around the print, and to make the print itself a little smaller so as to leave a white border between the print and the tinted border.

**Plate Sinking.**— If the print is to be plate sunk—the reverse of embossing—it should be made on a large sheet of double weight paper, printing through a rectangular mask so that the edges will be well defined.

A rectangular piece of cardboard should then be cut, with dimensions  $\frac{1}{2}$  inch greater on each side than those of the print. This should be laid flat on the table and the print placed over it face down, so that the portrait will be centered over the cardboard. This is most easily done by gumming the cardboard to a large sheet of glass, adjusting the print by looking through it, holding the glass and print between the eye and a bright light, and then laying the whole carefully on the table. It is rather difficult to place the print face down on the cardboard unless this method is adopted. Having adjusted the cardboard, it should be held firmly with the fingers of one hand, while the rounded handle of a table knife, or something similar, is pressed down heavily and run around the edges of the cardboard, forcing the unsupported edge of the print against the sheet of glass. The pressure should be applied on all four sides three or four times, so that when the print is picked up it will be found that the central portion is about 1-16 inch below the level of the edges, which may be trimmed as desired. The cardboard which is used to form the depression can be of any size desired, so that the margin around the print to the edge of the plate-sunk area may be of a suitable width. It is sometimes very effective to make use of plate-sinking and double-printing in combination, allowing a white border around the print, with a tinted border outside of the white one. The white border and print are then plate-sunk, while the tinted border is not.

**Vignetting.**— Oftentimes it is desirable to make a bust portrait with a plain white background, from a negative with a three-quarter or full length figure against a gray background. This can be done by vignetting in much

the same manner as described on a former page when speaking of the making of vignetted negatives. A sheet of cardboard makes an efficient vignetter. A section should be cut out, roughly the shape of the image it is desired to retain on the print, but smaller. The edges of this opening should be serrated. In printing, the paper is placed over the negative in the printing frame, and the vignetter is held between the light source and the front of the frame, at such a distance that light is projected through the opening and falls on the negative only where it is desired to print, while the rest of the negative is cut off from the light by the body of the vignetter. The vignetter must be kept slightly in motion during the exposure so that the edges of the vignetted print will be softened. They may be further softened by swabbing gently with a tuft of cotton soaked in a dilute solution of potassium ferricyanide. This must be applied sparingly and washed off quickly under the tap as soon as any signs of bleaching appear. The print should not be held on an angle meantime, as the ferricyanide solution may run down over the rest of the paper, causing streaks. The ferricyanide may be applied after the print has been in the fixing solution for a moment or two, after which it should be returned for the remaining period of fixing.

**Special Printing Methods.**—Although a straight black and white portrait, well finished, is as well suited to the production of a *likeness* as the most fastidious person could demand, there are many who are looking for “something different,” be it in the style of their clothes or their portraits. There is a certain satisfaction in turning out an artistic product slightly different from that which the other man has to offer. The use of

a soft-focus lens offers a bewildering field for those who seek artistic expression; this is not confined to the making of the negative, for if a man must work under conditions that make it impossible to make use of his soft-focus lens — possibly because of its unsuitable focal length — it can nevertheless be used later in making an enlarged portrait. Other soft-focus dodges are mentioned in *Practical Photography* No. 5, "How to Make Enlargements."

Those who are expert in coloring photographs will find good opportunity to test their skill in the coloring of portraits. This is difficult, to say the least, and no one who has not acquired considerable skill at coloring is advised to attempt it.

More advanced workers will find the field of portraiture in color photography an interesting one. There are four color processes which are in extensive use today. The Autochrome and Paget color processes are described extensively in *Practical Photography* No. 4, "How To Make Prints In Colors." Two others which offer distinctive advantages are the Kodachrome Process, in which a transparency in color is mounted in a special illuminating frame, and the image viewed by virtue of the light behind it. This process is being extensively developed by the Kodak Company for their professional trade. The other is the Hicro Process, developed by the Hess-Ives Company. Recent improvements of this process have placed it within the scope of the amateur's outfit, and prints in colors are now within reach of any worker who has mastered straight photography. A special plate holder is required, but otherwise the amateur may use his camera without alteration. The new Hiblock is handled like a

single plate in the holder, although it actually consists of a green sensitive film bound between blue and red sensitive plates respectively. After exposure, these are developed separately, and three prints made on special mediums, bound later in exact register to make a print in color.

**Portraits by Enlarging.**—As the great body of amateurs will produce their first portraits with small cameras, it seems wise to give detailed attention to the methods by which enlarged portraits can be made. The reader is referred to No. 5 of this series, "How To Make Enlargements," for a complete treatise on the subject of enlarging. The practical application of the facts given in that volume is considered in the following paragraphs from the standpoint of the portrait worker.

As in all photographic processes, a suitable negative is the starting point in the production of a successful portrait. The negative which is well suited for contact printing, however, is not necessarily satisfactory for enlarging, as a desideratum in portraits is softness, while contrast is increased in the process of enlarging. In consequence of this, if the negative is to be used for making an enlargement, it should not be as fully developed as for contact printing; even though quite soft, by using a suitable printing paper for contact work, the range of tones may be lengthened sufficiently, but the reverse is not true if the negative is contrasty. With this in mind it will be seen that it may often be necessary to prepare the negative for enlarging, by reducing the contrast. This is especially true if the subject is dressed in white and possibly posed against a dark background, so that excessive contrast and halation are in evidence. Because of these facts it will be wise next to consider:

**Preparation of the Negative for Enlarging.**—The most common fault with portrait negatives is due to underexposure; forced development has followed, with the result that a contrasty image, and sometimes a stained emulsion, is in evidence when the negative has been dried. To save time, examine the negative as soon as it has been thoroughly fixed, and if it is too contrasty for enlarging, prepare the reducing solution while the negative is washing. This reducer must be selected and used in such fashion that it will reduce the highlights as much as possible without eating away the detail in the shadows, which is all too small at the outset, due to the underexposure. A reducer of this type, which is simple to use, is ammonium persulphate. This chemical spoils very easily and so should be bought in small quantity, and the container tightly sealed after removing an amount of the chemical required for the work at hand. Make up a solution containing 15 grains of persulphate to the ounce of water; be generous in the amount of solution, as the plate should be easily flooded with it. The negative must be very thoroughly washed before reduction, as any trace of hypo in the emulsion will be the cause of stains when the reducer is applied. Immerse the thoroughly washed negative in the persulphate solution and rock constantly to prevent uneven reduction. In two or three minutes the solution will begin to turn milky, showing that the reduction has begun. If only a slight action is needed, remove the negative from the reducer as soon as the milky color is attained, rinse quickly under the tap, and immerse in a solution of sodium sulphite, made up in the proportion of 1 ounce of the anhydrous salt to 10 ounces of water. If this is not done, reduction of the

image will continue. After soaking for ten minutes in the sulphite solution, which stops the action of the reducer, wash the negative thoroughly in running water. The result should be a negative whose printing quality is the same as if it had been developed less at the outset.

If applied to the dry negative, acidified potassium permanganate has about the same action as the ammonium persulphate, *i.e.*, it reduces the highlights more rapidly than the shadows. If the negative is treated in a wet condition, the action is much the same as that of the hypo and ferricyanide reducer, of which more later. In use make up two solutions as follows:

A. Potassium permanganate.....	7 grains
Distilled water.....	35 ounces
Sulphuric acid, C.P. (1.84 S.G.).....	30 minims
B. Sodium bisulphite (liquid).....	1 ounce
Water.....	10 ounces

Immerse the negative, dry, in Solution A. It will be discolored, but the color may be discharged by rinsing and immersing the negative in Solution B. The amount of the reduction depends on the length of time the negative is allowed to soak in the permanganate solution, and the worker will be able to judge this after a few trials with negatives which have no particular value and may therefore be used for experimenting.

The hypo and ferricyanide reducer mentioned earlier, reduces the negative evenly over its entire surface. It is valuable for this purpose in case the negative is too dense, usually characteristic of overexposed negatives if they are fully developed. Such negatives require what is sometimes an impossible exposure in the enlarger, with the result that it is the part of wisdom to glance through the negatives before indulging in an "enlarging spree," reducing those which seem too dense,



allowing them to dry while the other negatives are run through the enlarger. (A negative which has once been dried, will dry very rapidly even though thoroughly washed after reduction, so that reduced negatives may often be ready for use in the enlarger a few moments after removal from the wash water.) If the negative is slightly veiled with fog, or slightly stained, this reducer will help materially. It does not keep well in solution and should be mixed fresh for use. Make up a solution of hypo, about 1 to 6; place a few crystals of potassium ferricyanide in water in an amber glass bottle (this may be kept for stock solution) and when in solution, add enough to the hypo solution to turn it a straw color. Immerse the negative in this and rock constantly. The action is rapid, and the plate should be watched to make sure that too much detail is not removed. Before holding the negative to the light for examination, rinse it thoroughly; if this is not done the reducer will act unevenly, streaking the negative. Wash well.

Another very useful process, which should be noted by every photographer, for portrait and every other branch of the art, is one credited to Eder, which eliminates halation and stains by the simple process of rehalogenizing the negative. Before attempting this process, consider the nature of halation. This is caused by reflection and refraction of light rays from the support of the emulsion, back into its lower strata. When developed, these reflected rays will be found as halos or a solid mass of reduced silver around the highlights of the image, as well as within their outlines. *The halation image is deep down in the emulsion.* In Eder's process, the image is rehalogenized and then redeveloped, but *only the surface of the image is developed a*

*second time*, and as soon as the image begins to build up in the lower part of the emulsion, development is stopped and the negative is plunged into the fixing bath, and the part of the image which is undeveloped (the part which is next the support of the emulsion and originally showed halation) is dissolved out, so that the finished negative is not only reduced as to its density but also the halation has disappeared. While halation is met with in all branches of photography, it is nowhere more distressing than in portraits where delicate white drapery or laces may be imaged as a solid mass of white, and consequently, portrait workers will find Eder's process very valuable. A bleaching solution should be mixed as follows:

Potassium bichromate . . . . .	1 part
Hydrochloric acid . . . . .	3 parts
Alum . . . . .	5 parts
Water . . . . .	100 parts

The wet negative should be immersed in this, and will gradually turn white; it should be left in the solution until it is white through to the back of the emulsion. When bleached fully, wash for an hour in several changes of water. It may then be redeveloped in an old alkaline developer — hydro-metol is satisfactory — carrying development only to the point where the shadow detail begins to develop, not developing the highlights through to the back of the emulsion. As soon as the development has proceeded far enough, the plate should be rinsed and again fixed, the latter operation removing the undeveloped chloride of silver at the back of the negative; wash thoroughly again. When dry, the negative will be found to have lost much of its harshness; many an apparently hopeless negative has been made usable by this method.

**Using the Enlarger.**—The negative is now supposedly chemically correct, and freed from small blemishes, pinholes and scratches having been spotted out. Placed in the enlarger, the image is thrown on the easel and focused, the paper adjusted while the lens is capped, and an exposure made. Upon development of the first sheet, we are able to tell whether our preparations have been sufficient. Possibly reduction has not been carried quite far enough; perhaps some of the highlights are still too dense; perhaps one part of the image is about right, while another is too dark or too light. In many cases it will not be necessary to do further chemical work on the negative, as it is possible to do the mechanical work in such fashion that the image may be modified to suit the operator.

First, let us suppose that the background is too dark, or seems patchy, and would be better if removed altogether, leaving the image against a white background. There are a number of methods of doing this; each worker generally has some little "wrinkle" of his own devising that he finds to be very satisfactory. About the easiest method is to use brush and opaque, with India ink at the beginning. The latter is used to outline the image; around this for about one-fourth inch a band of opaque is applied, and the rest of the background is blocked out with black paper, an opening, cut to slightly overlap the opaque, being made before the paper is attached to the negative. The principal objection to this method is that the outline is necessarily hard. Another method is to place a sheet of white paper on the easel and project on it the image of the negative, considerably smaller than the enlargement is to be. With pencil, outline the figure carefully on the

white paper. Remove this from the easel and place it on a sheet of thin cardboard and cut through paper and cardboard with a sharp knife, running it around the outline drawn on the white paper. Then place the negative in position and make an enlargement as usual, holding the cardboard between the lens and the easel in such fashion that only the image is projected through the opening. The cardboard must be kept in motion throughout the exposure so that the image will blend softly with the background; if not kept in motion there will be a sharp line indicating the position of the cardboard mask. A combination of these two methods is often effective. First, decide how much background seems desirable. Cut a black paper mask with an opening which allows light to pass freely through the part of the background which it is desired to retain. Then make a cardboard shading mask with an opening shaped to the image itself. In making the exposure, hold this in such a position that somewhat more than the image is projected through the opening; by keeping the cardboard in motion, the blend is soft, and the fact that the negative is partially blocked off prevents the background from being shown in greater proportion than desired. If a sharp line shows at the edge of the vignetted background, use a little of the ferricyanide and hypo reducer to soften the edge, or reduce the image as much as desired, using the reducer in quite dilute solution applied with a tuft of cotton, and with running water convenient so that the image can be rinsed off quickly as soon as reduction is evident.

In case a portion of the image seems too light, it can be darkened by using a cardboard mask with a suitably shaped opening in it, or simply by shading with a

rectangle of cardboard. Suppose, for instance, that a child dressed in white was the subject, and the dress shows very little detail, much less than can be seen in the negative. Cut a small opening in the cardboard — size varying according to the size of the image, of course — and make an exposure of suitable duration, holding the cardboard so that light passes through the opening to the dress portions of the image on the easel. Keep the cardboard in motion so that there will be no abrupt lines. This same method may be used to reduce a highlight somewhere on a portrait image, if it is too strong or out of place so that it detracts from the scheme of lighting. It occasionally happens that the lower part of a full length portrait seems too light, the accent on the features not being strong enough. In such case, use a plain sheet of cardboard, shading the upper portion of the image so that the exposure of the lower section will be longer. This is done by holding the cardboard between the lens and the easel, above the pencil of light coming from the lens, and lowering it slowly after sufficient exposure has been given to the upper parts of the image, gradually cutting them off from the light, giving the cardboard an up-and-down motion as the arm is gradually lowered. In this way the lower part of the image will develop up darker and the accent on the features may be preserved.

Just the reverse of these operations may be accomplished by impaling a small piece of cardboard on a long thin hatpin, or by pinning the cardboard to the intersection of two pieces of black thread criss-crossed on a basket hoop. The cardboard is held in front of a small portion which it is desired to make lighter in tone, and kept in motion so as to make the blend soft. In

all these operations the secret of success lies in keeping the mask or vignetter in motion so that the blend is soft.

Another method of softly blending the edges of a vignetted enlargement is to serrate the edges of the mask like the cutting edge of a saw, except that the teeth must be long and deeply cut. They may project somewhat over the edges of the image which is to be retained, and must be kept in motion to prevent the images of the teeth from being silhouetted against the paper. This method is useful when it is desired to make a bust portrait from a full length portrait negative. Serrate the vignetter on the lower edge of the opening, extending the teeth downward so that the bust will gradually fade away.

**Sepia Enlargements.**— A plain black and white portrait is about as satisfactory as one can desire, if it is well made. When made on a buff or tinted paper, the straight enlargement needs only cleaning, trimming, and mounting to secure an effect that should satisfy anyone. Many like to go a step further and tone their black and white prints to a sepia color. This can be done so easily that anyone who prefers the sepia portraits should not hesitate to finish them in that color.

The first requisite of a print to be toned is that it shall be thoroughly developed. In the fourth number of this series, "How To Make Prints In Colors," it is fully explained that this condition must exist, why, and how to proceed to make sure of full development. Those who are not sure of their ground on this point are advised to secure the above volume, as the thorough development is essential from the standpoint of color, both of the black and white and the toned print. The thoroughness of the production of the black and white

print, as to development, fixing, and washing, are all vitally important, so that in making prints for toning omit no detail and try no short cuts.

For sepias, two methods are in common vogue, hypo alum toning and

**Redevelopment.**—Metallic silver can readily be converted to brown silver sulphide by first converting it to a silver salt and then precipitating the silver sulphide through the action of any soluble sulphide. The one commonly used is sodium sulphide. Two separate baths are needed. The first forms silver ferricyanide in the print, and a typical formula is:

Water . . . . .	64 ounces
Potassium ferricyanide (red prussiate) . . .	220 grains
Potassium bromide . . . . .	220 grains
Stronger ammonia water, U.S.P. . . . .	30-40 minims

The print, well washed to free it from every trace of hypo, is immersed in this bath and left until the last trace of black has disappeared from the deepest shadows. The next step is rinsing, which should be performed in running water, the only essential being to remove all traces of the bath from the surface of the print. It may then be put into the redeveloper, best made as follows:

Stock 20 percent sulphide solution . . . . .	3 ounces
Water to make . . . . .	20 ounces

The stock sulphide is made by dissolving the sodium sulphide, as soon as bought — rejecting any sample of the crystal form which has not a clear white color — in sufficient water to make a 20 per cent solution. This should then be boiled in a Florence flask for about half an hour to insure keeping quality, allowed to cool, and made up to the original bulk with water. The boiling is not necessary, but it is a useful precaution and prevents one's using a weak or decomposed bath and thus

spoiling the prints. The diluted bath should not be saved for future use. Neither should the bleacher be overworked. If it does not remove the last trace of black in 2 minutes, take a fresh bath. The sulphiding bath should redevelop the picture to a rich sepia in from a few seconds to one or two minutes. If it does not, it is a sure sign of exhaustion. These two points will prevent all troubles not due to softening of the gelatine or impurities in the chemicals.

Prints for sulphide toning must be thoroughly hardened before redevelopment, or they will soften and blister freely. It is wise in warm weather to dry the black and white print, soaking it in clean cold water for about five minutes before bleaching. Unless the standard acid hypo with alum has been used, it may be necessary, in warm weather, to give the prints a treatment with a solution containing from 2 to 4 per cent of alum, after washing long enough to get rid of the hypo, and finally wash well to remove all traces of alum. Unless the hypo is completely eliminated, it will form with the ferricyanide of the bleaching bath a reducing agent (Howard Farmer's) and eat away some of the detail of the print. An hour in running water, keeping the prints thoroughly separated, is none too long to insure complete elimination of hypo. A good test for hypo is

Potassium permanganate.....	2 grains
Potassium carbonate.....	20 grains
Distilled water to.....	40 ounces

Take a little of this solution in a clean graduate and hold the prints so that they will drip into it. If the pink color is discharged and replaced by a greenish-yellow or a brown coloration, hypo is present, and the



washing should be continued until the drippings no longer cause any alteration in the permanganate solution.

**Hypo-Alum Toning.**—When an acid hypo bath is old or improperly mixed, so that sulphur separates from it and makes the bath milky, it has a decided toning action on the silver image. Observation of this phenomenon led to the use of alum to throw down sulphur and thus give a bath which would tone prints overnight in the cold or in half an hour when used hot, say about 110 degrees F.

A typical plain formula is

Boiling distilled or rain water . . . . .	128 ounces
Hypo . . . . .	16 ounces
Alum . . . . .	4 ounces

To ripen, add to the above when cool

Distilled or rain water . . . . .	1 ounce
Silver nitrate . . . . .	60 grains
Table salt . . . . .	60 grains

**The Artura Method.**—One of the most reliable sepia-toning baths is that published for use primarily with Artura Iris; but it works well with other papers. It is possible, with this formula, to get exactly the same sepia on both gaslight and bromide papers and to match the color of a carbon sepia print precisely. The prints need not be washed after fixing any longer than is needed to eliminate the acid from the fixing bath. Then tone as follows:

No. 1.—Boiling rain or distilled water . . .	128 ounces
Hypo . . . . .	16 ounces
Alum . . . . .	2 ounces
Boil two minutes	

Allow to cool and then add sodium phosphate 2 ounces

*At this point test the bath with red litmus, which should turn blue within one minute. If it does not, heat the*

bath again and add hypo in 4-ounce quantities until it does. When a *slightly alkaline* bath is obtained dissolve

Silver nitrate.....	60 grains
Water.....	1 ounce

and

Potassium bromide.....	180 grains
Water.....	1 ounce

Pour the bromide solution into the silver solution, then add precipitate and all to the *cool* hypo-alum bath. If the silver and bromide are added to the bath while hot, it will turn dark. It is necessary to have the water at boiling point when the hypo and alum are being mixed. The other ingredients *must* be added at lower temperature.

No. 2.—Gold chloride.....	15 grains
Water.....	2 ounces

This bath must be neutralized with precipitated chalk.

**The Toning Operation.**—When ready to tone, take as many ounces of bath as are necessary for the number of prints and add 1 dram of gold solution (No. 2) to each 16 ounces of hypo-alum bath (No. 1). This quantity (128 ounces) will tone 1 gross of cabinet or 4 x 6 prints or the equivalent in other sizes. It is advisable to use fresh bath when this number of prints has been toned rather than attempt to renew its strength by the addition of gold. For a small batch of prints prepare a small bath. Preserve the same proportion of chemicals as advised in the above formula.

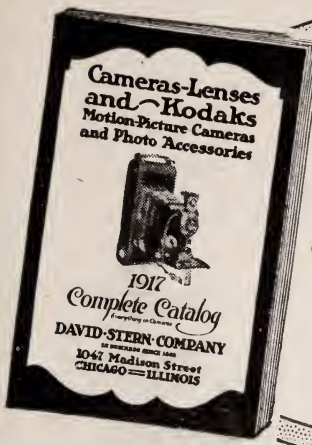
The entire lot of prints should be placed in the bath at one time, keeping them well separated during the process of toning. Tone at 120 degrees to 125 degrees F. Do not begin toning at a lower temperature than 120 degrees. Thick rubber gloves are advised.

The time of toning should be about 20 minutes. The toning bath should be slightly alkaline. This can be determined by testing with litmus paper. If the bath is too cold the gold tone will predominate; if too hot, the sulphur tone will predominate. To determine when the prints have been toned, examine by transmitted light, and when all black has been removed from the deepest shadows, it is safe to assume that the final color has been obtained. Sponge prints to remove any sediment. Return prints for five minutes to regular fixing bath. Wash in the regular way.

**Advanced Portraiture.**— Those to whom portraiture appeals, and who consider making it their specialty, will necessarily select equipment with the idea of making it most effective within this branch of the art. If home portraiture is to be attempted, involving the use of a camera outside of the studio, in the home of the photographer or his customer, a view camera will prove efficient. This should have the double extension bellows, large lens board, rack and pinion actuated movements, and sundry other attachments found on the modern high class view box. It is the only style which has a lens board large enough for long focus lenses. Occasionally it is possible to buy an old portrait camera at bargain price; for a permanent home studio such apparatus is admirable, but the average portrait worker will find the view camera of greater general utility. The reflex camera is well suited for use by the home portrait worker, and whereas subject to limitation in the matter of the swing back, it has compensating advantages, especially in the photography of children. Reflex cameras designed for use by the portrait worker are now on the market.

In selected special lenses for advanced work, there is a wide variety from which to choose. If the lens board is large enough, one of the Petzval type lenses (see *Practical Photography* No. 3, "How To Choose and Use a Lens") will be found advantageous, although modern compact anastigmats are in greater esteem by most workers. Other things being equal, the faster the lens, the better for home portraits. If the working space is sufficient, an  $f:4.5$  lens is good, if it can be used at a distance from the sitter great enough to permit employing of the wide open lens. Those who aim at ultra artistic results will find a field for their individuality in soft focus effects, which can be secured with any of the special lenses introduced to the photographic public in the last few years.

**Mounting.**—Many attractive mounts can be purchased, either of the folder or card type. The simpler the mount, the more effective. For this reason it is entirely feasible for the worker to lay in a small supply of cover papers and make his own mounts. Folders are very easy to make, while if a plain mount of the card type is desired, heavier mounting board may be purchased, or plain cardboard may be attached to cover paper to stiffen it. The method described for plate-sinking prints can be utilized for providing a plate-sunk space in which to mount the print, or an underlay of cover paper of a different shade than that of the lower mount may be placed under the print, with a narrow border showing. The mount may be plate sunk, and the underlay used in the plate-sunk area, too, if desired. Many artistic combinations can be designed by the intelligent worker.



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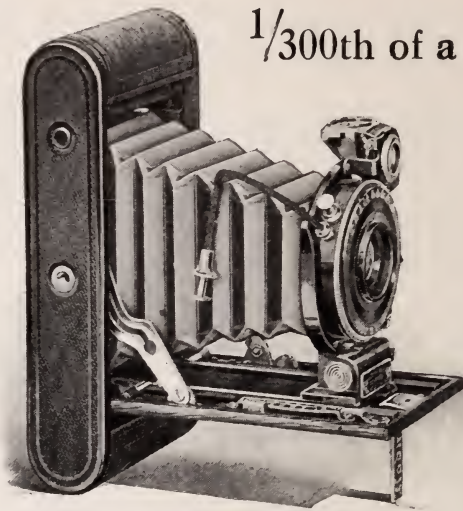
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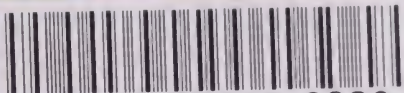
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